A.D. 1874, 18th September. Nº 3199.

SPECIFICATION

OF

JOHN HOWARD KIDD.

TREATING SEWAGE FOR MANUFACTURING MANURE.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:
PUBLISHED AT THE GREAT SEAL PATENT OFFICE,
25, SOUTHAMPTON BUILDINGS, HOLBORN.
1875.

A.D. 1874, 19th September. N° 3199.

Treating Sewage for Manufacturing Manure.

LETTERS PATENT to John Howard Kidd, of Wrexham, in the County of Denbigh, for the Invention of "Improvements in the Mode of and in Arrangements and Apparatus for Manufacturing Manure from Sewage, Night Soil, and like Matters, and in the Preparation and Application of certain Materials for Deodorising Sewage, Night Soil, and like Matters."

Sealed the 5th March 1875, and dated the 19th September 1874.

PROVISIONAL SPECIFICATION left by the said John Howard Kidd at the Office of the Commissioners of Patents, with his Petition, on the 19th September 1874.

I, John Howard Kidd, of Wrexham, in the County of Denbigh, do hereby declare the nature of the said Invention for "Improvements in the Mode of and in Arrangements and Apparatus for Manufacturing Manure from Sewage, Night Soil, and like Matters, and in the Preparation and Application of certain Materials for Deodorising Sewage, Night Soil, and like Matters," to be as follows:—

Firstly. My Invention consists in taking the sewage to a tank, where the solid matter is allowed to settle until the liquid becomes comparatively free from solid matter, when it is drawn away; then the sediment is removed from the tank on to a filter bed of any well known construction. I prefer to form it of gravel below and sand above, over which there are iron grids. On this filter bed the moisture is allowed to drain away, and the sediment is then removed from the filter bed to an hopper having a series of rotary shafts armed with teeth, the teeth on one set of shafts passing between those on the other set of shafts to break it up and feed it into one end of an horizontal pipe or cylinder, the exterior of which is heated by a flue from a furnace, or by having a casing round it, through which steam, hot water, or other heating medium passes; the material being carried slowly through the cylinder by a screw or shaft armed with screw blades rotating in the axis of the cylinder. The material may be passed from this cylinder to another, if on the same level, by a screw; if below the first cylinder it drops into the second, and so on through several cylinders until sufficiently dry; being discharged from a spout at the end of the last cylinder into sacks ready for the user. On entering the first drying cylinder the material meets and mixes with a jet of diluted sulphuric acid brought by a pipe from a cistern, which helps to fix the ammonia and render it less volatile.

Night soil is treated in like manner, except that no settling tank is required, the night soil being placed directly upon the filter bed to separate the solid matter from the urine, a small per-centage of which may be added to the dry material from the drying cylinders if desired. Such of the volatile ammonia as may be driven off by the drying process is conveyed by pipes from the drying cylinders to a tank containing sulphuric acid.

Secondly, My Invention consists in applying as a deodorizer carbonaceous or coal shales, or coal washings, which materials are heated or carbonised in a suitable furnace, such as a retort or coke furnace, and is then pulverized if desired. When thus prepared it is mixed with the sewage or night soil, or other like matters requiring to be deodorized.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said John Howard Kidd in the Great Seal Patent Office on the 11th March 1875.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOHN HOWARD KIDD, of Wrexham, in the County of Denbigh, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Nineteenth day of September, in the year of our Lord One thousand eight hundred and seventy-four, in the thirty-eighth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said John Howard Kidd, Her special license that I, the said John Howard Kidd, my executors, administrators, and assigns, or such others as I, the said John Howard Kidd, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN THE MODE OF AND IN ARRANGEMENTS AND APPARATUS FOR MANUFACTURING MANURE FROM SEWAGE, NIGHT SOIL, AND LIKE MATTERS, AND IN THE PREPARATION AND APPLICATION OF CERTAIN MATERIALS FOR DEODORIZING SEWAGE, NIGHT SOIL, AND LIKE MATTERS," upon the condition (amongst others) that I, the said John Howard Kidd, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said John Howard Kidd, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement and accompanying Drawings (that is to say):—

Firstly. My Invention consists in taking the sewage to a tank, where the solid matter is allowed to settle, and when the liquid becomes comparatively free from solid matter it is drawn away; then the sediment is removed from the tank on to a filter or drying bed of any well known construction. I prefer to form the filter or drying bed of gravel below and sand above, with iron bars, about ten inches apart, passing lengthway of the bed to form a grid, upon which scrapers may rest when removing the sludge after the liquid has drained away and the sludge has become comparatively dry, when such sludge or sediment is taken to an hopper, which may have a series of rotary shafts armed with teeth, the teeth of one pair of shafts passing between those of the other pair of shafts to break it up and feed it into one end of a horizontal pipe or cylinder, the exterior of which is heated by a flue from a furnace or by having a casing round it, through which steam, hot water, or other heating medium passes; the material being carried slowly through the cylinder by a screw or shaft armed with screw blades, which shaft is placed to rotate in the axis of the cylinder. The material may be passed from this cylinder to another, if on the same level, by a screw; if the second cylinder is below the first cylinder it drops into the second, and so on through several cylinders if ~~required~~ until sufficiently dry, being discharged from a spout at the end of the last cylinder into sacks ready for the user.

Night soil is treated like sewage, except that no settling tank is required, the night soil being placed directly upon the filter or drying bed to separate the solid matter from the urine, a small per-centage of which may be added to the dry material from the drying cylinders if desired.

Whilst the sewage sediment or night soil is upon the filter or drying bed, or while it is entering the hopper of the drying cylinders, it may be sprinkled with diluted sulphuric acid, or carbonaceous materials may be added, so as to dry and deodorize the sludge or night soil. Ammonia driven off as the material passes through the drying cylinders may be conveyed from them by a pipe to a cistern or tank containing sulphuric acid.

Fig. 1 of the accompanying Drawings is a plan shewing arrangement of settling tanks, filter or drying bed, and drying cylinders, as I prefer to use them; and Fig. 2 is a sectional elevation on the line A, B, Fig. 1.

Fig. 3 is a longitudinal section upon an enlarged scale of one set of the drying cylinders; and Fig. 4 is an end elevation.

a represents part of the settling tanks, which run in their lengthway at a right angle to the building (*b*), in which the filter or drying bed is formed; there being a narrow path *c* between the end of the tanks (*a*) and the building (*b*) for the filter and drying bed. This building has side doors at suitable intervals, so that the sediment from the tanks (*a*) may be removed in the most direct manner and placed upon the filter or drying bed. The filter or drying bed *d* is formed over an arched flue *e* that passes under the lengthway of the drying bed and communicates with a chimney *f* at the extreme end of the building. The filter or drying bed *d* is formed by gravel, and then sand, and iron bars, the lengthway of the bed, forming a grid; and side chains *g* are made to allow the liquid which passes through the filter bed to run to the tanks (*a*) or pass away with the liquid drawn off from the tanks. The space above the filter or drying bed forms a chamber, which communicates with the chimney (*f*) at that end, so that air or the products of combustion from the fires heating the drying cylinders may pass into the chamber at one end and out of the chamber to the chimney at the other end, carrying away with it the moisture from the material on the drying bed; and a large (if not the main part) of the products of combustion from the furnace that heats the drying cylinders passes to the chimney through the flue *e* under the drying or filter bed, but a part of such products of combustion may be allowed to pass to the drying chamber at *h*, see Fig. 2.

Three sets of drying cylinders *k* are shown, each set consisting of three cylinders, one above the other, *l* being the furnace for heating the three sets of cylinders. The chamber *b*, and filter or drying bed *d*, may be of any convenient length, according to the quantity of sediment or night soil to be treated, two sets of drying cylinders being shewn in the plan, Fig. 1.

The drying cylinders *k* are supported at each end in wall boxes *m* of iron, as shewn, so that the cylinders may be replaced without disturbing the wall. The shaft *n*, which passes through each cylinder, has an helical screw w^1 upon it, or a series of screw blades. The shafts are geared together, as shewn, and may be driven by the power employed in the most convenient manner; *p* is the hopper through which the material is fed to the first cylinder *k*, which hopper has four shafts, as shewn, armed with teeth or arms; the teeth or arms on one shaft in each pair passing between those upon the other shaft, which shafts may be geared and driven as shewn; k^3 is the outlet from the lower cylinder for the dry material.

I have now particularly described the nature of my Invention, and the mode of carrying it into effect, and claim as my Invention the treating of sewage and night soil, substantially in the manner and by the arrangement and apparatus herein-before described and illustrated by the Drawings.

In witness whereof, I, the said John Howard Kidd, have hereunto set my hand and seal, this Second day of March, in the year of our Lord One thousand eight hundred and seventy-five.

JOHN HOWARD KIDD. (L.S.)

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KIDD'S SPECIFICATION.

(1 SHEET)

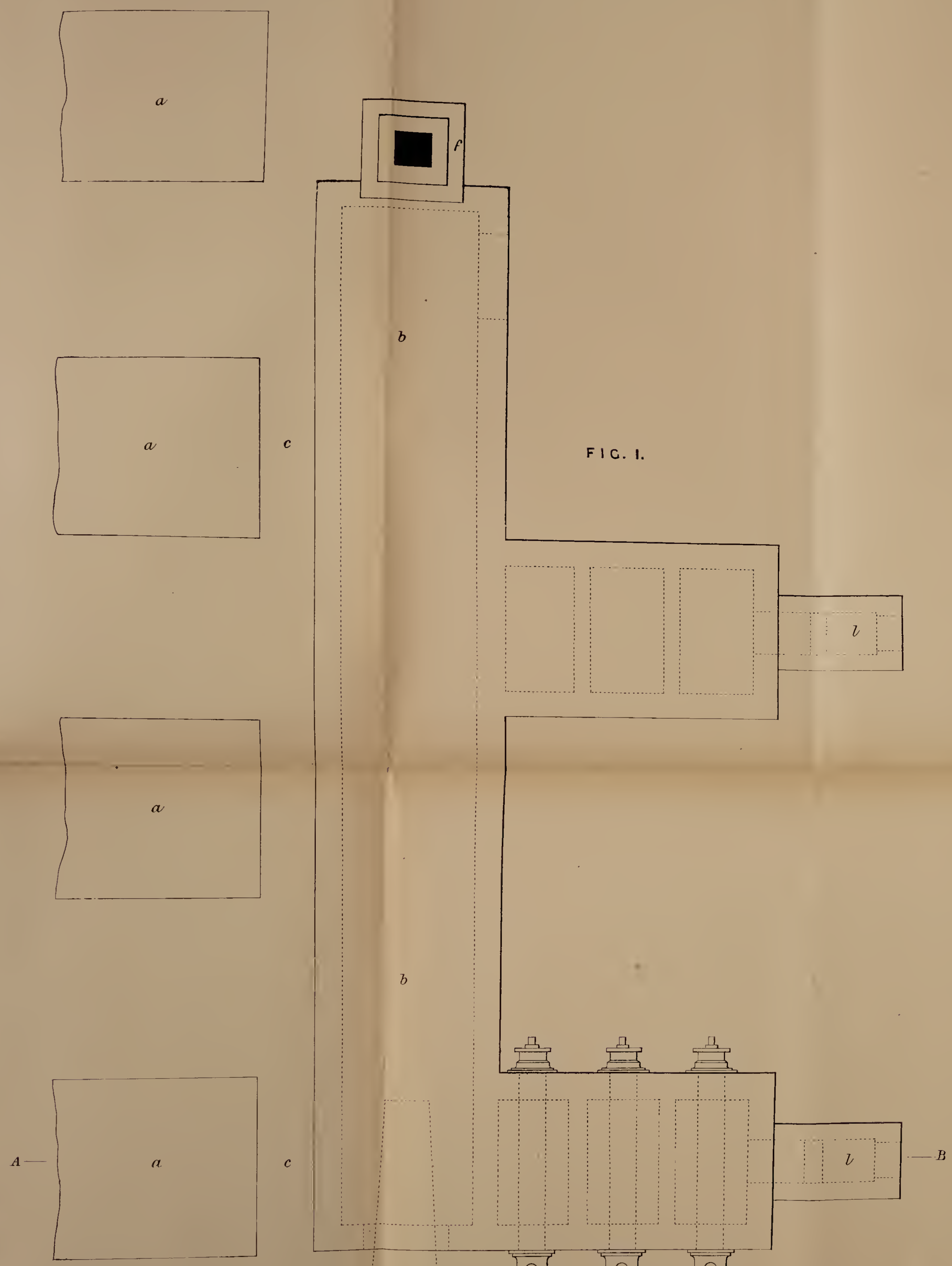

FIG. 1.

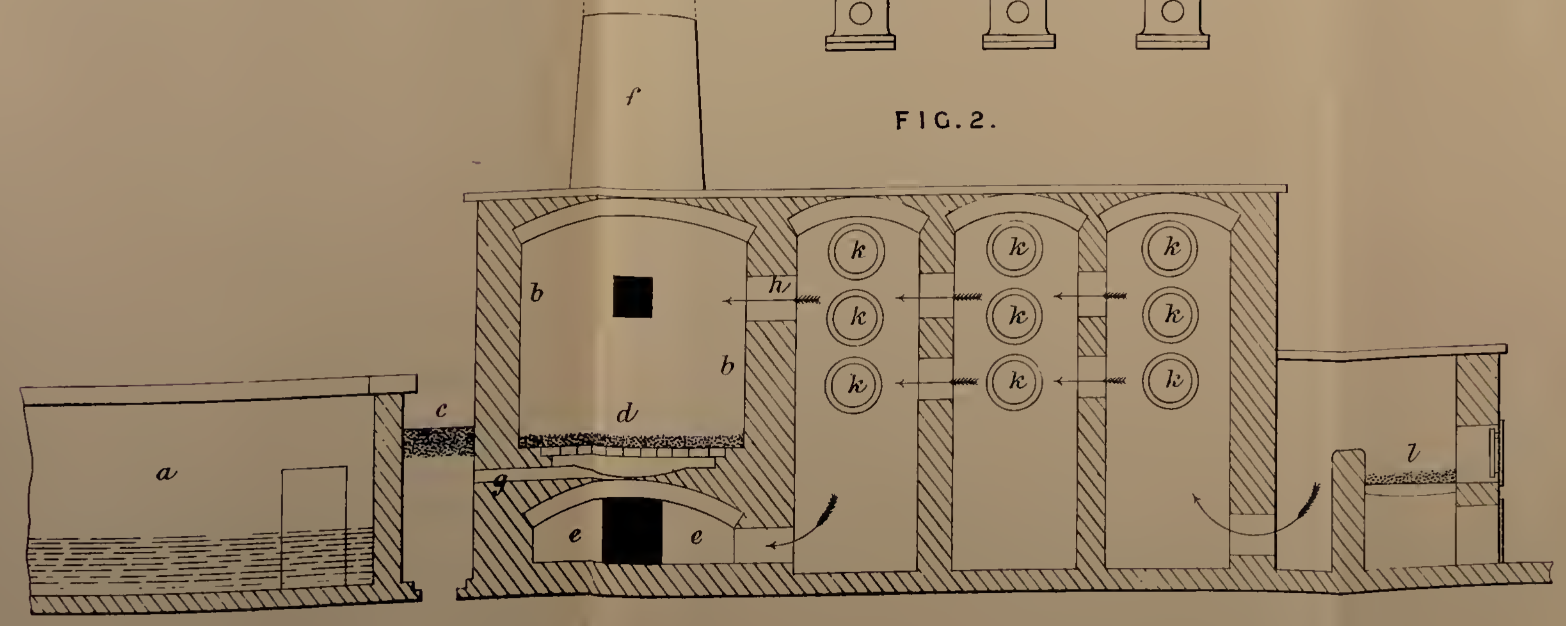

FIG. 2.

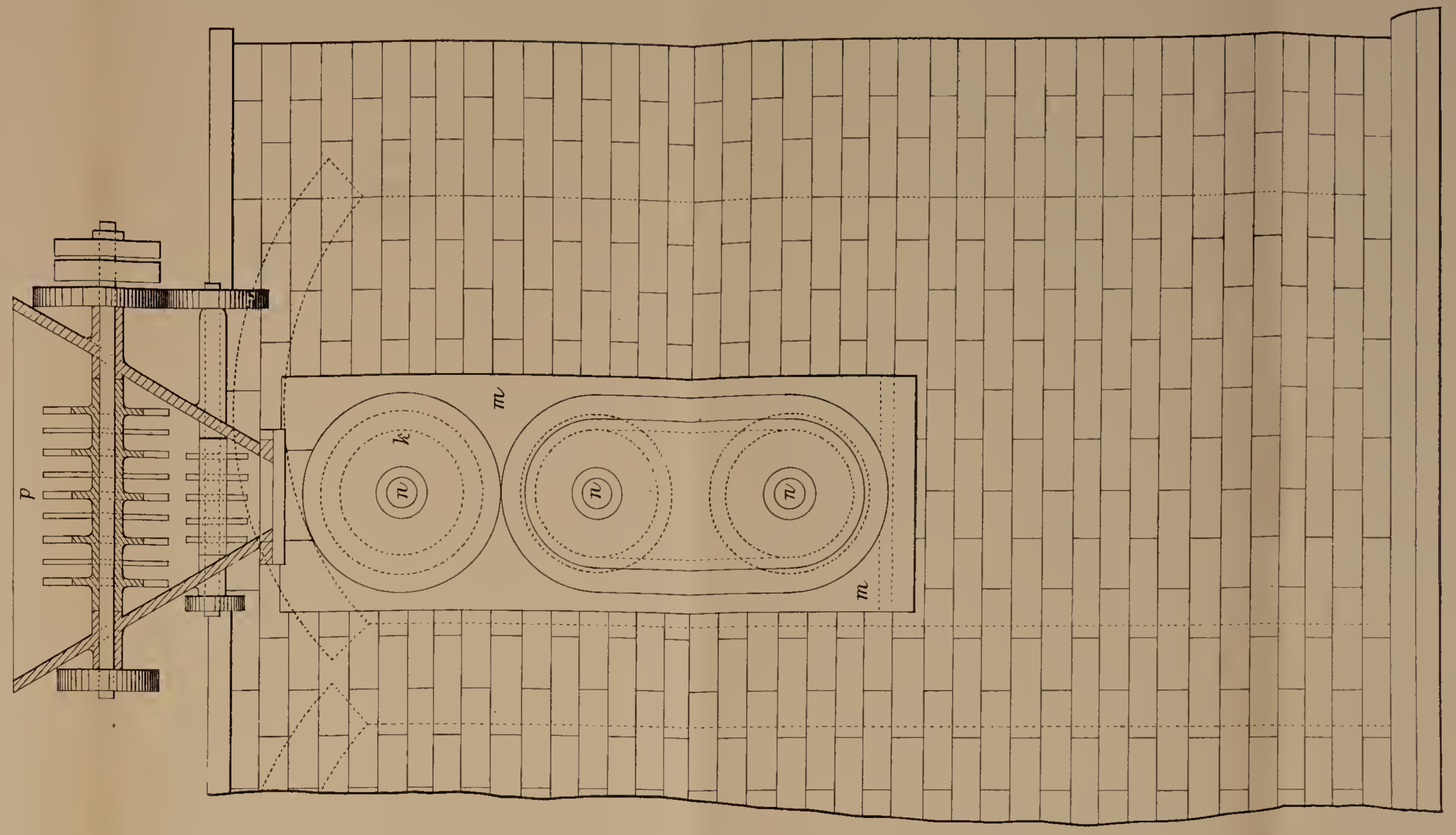

FIG. 4.

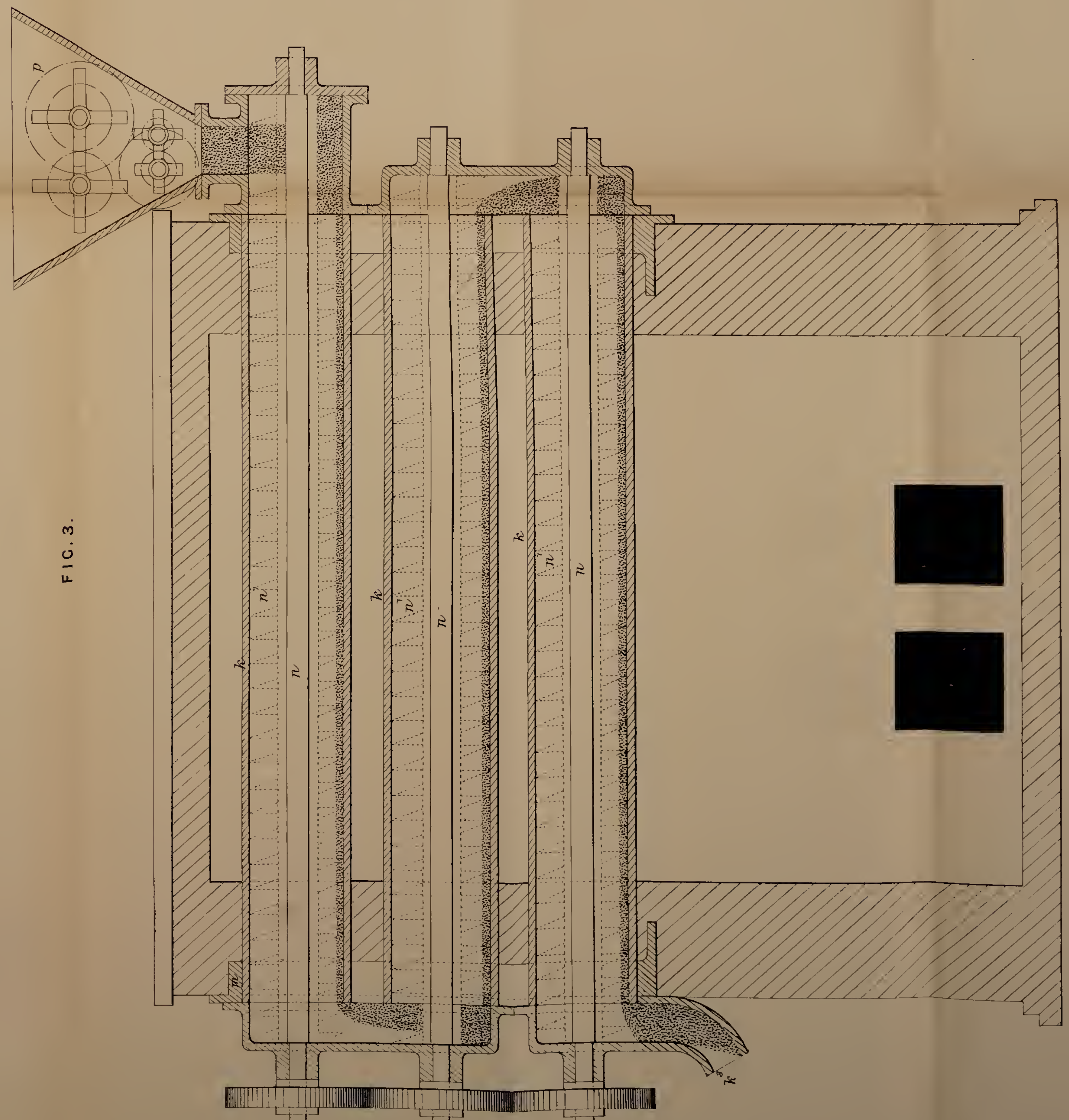

FIG. 3.

The filed drawing is not colored.

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